

PIRLIMYCIN Veterinary—Intramammary-Local

Some commonly used *brand names* are *Pirsue Aqueous Gel* and *Pirsue Sterile Solution* {R-1}.

Note: For a listing of dosage forms and brand names by country availability, see the *Dosage Forms* section(s).

Category: Antibacterial (intramammary-local).

Indications

General considerations

Pirlimycin is a lincosamide antibiotic with activity primarily against gram-positive organisms, including *Staphylococcus* and *Streptococcus* species. {R-1} It is considered more active than clindamycin against *Staphylococcus aureus*. {R-5} Pirlimycin is not active against gram-negative bacteria, such as *Escherichia coli*. {R-10}

Accepted

Mastitis (treatment)—*Cows*, lactating: Pirlimycin is indicated in the treatment of clinical and subclinical mastitis caused by *Staphylococcus aureus*, *Streptococcus agalactiae*, *Streptococcus dysgalactiae*, and *Streptococcus uberis*. {R-1}

In refractory cases of chronic *Staphylococcus aureus* mastitis, administration of intramammary pirlimycin at recommended doses is sufficient to control but not eliminate the pathogen. {R-4}

Intramammary therapy alone is indicated only in the treatment of subacute or subclinical mastitis manifested by mild changes in the milk or udder. Cows with acute or peracute mastitis, which involves gross changes in the milk or udder or systemic signs, should be given other medications also, which may include systemic antibiotics and/or supportive therapy. {R-6}

Regulatory Considerations

U.S. and Canada—

Withdrawal times have been established for cattle. See the *Dosage Forms* section. {R-1}

Chemistry

Source: Semisynthetic derivative of lincomycin. {R-3}

Chemical group: Lincosamide antibiotic.

Chemical name: Pirlimycin hydrochloride—*L-threo*- α -D-galactooctopyranoside, methyl 7-chloro-6,7,8-trideoxy-6-[(4-ethyl-2-piperidinyl)carbonylamino]-1-thio-, monohydrochloride, monohydrate, (2*S*-*cis*). {R-2}

Molecular formula: Pirlimycin hydrochloride—

$C_{17}H_{31}ClN_2O_5S \cdot HCl \cdot H_2O$. {R-2}

Molecular weight: Pirlimycin hydrochloride—465.43 {R-2}.

pKa: 8.5. {R-3}

Pharmacology/Pharmacokinetics

Mechanism of action/Effect: Pirlimycin is bacteriostatic at therapeutic concentrations. {R-3} The lincosamides inhibit protein synthesis in susceptible bacteria by binding to the 50 S ribosomal subunits of bacterial ribosomes and preventing peptide bond formation. {R-7}

Absorption: Almost one half of the dose is absorbed systemically after intramammary administration. {R-5}

Distribution: Pirlimycin is lipophilic and diffuses readily across tissue membranes. {R-3}

Biotransformation: Pirlimycin is eliminated primarily as parent drug

when administered by the intramammary route; however, 4% of the dose is oxidized by the liver to pirlimycin sulfoxide **{R-5}**.

Peak concentrations: Based on two intramammary doses of 50 mg each, given 24 hours apart —
Blood: 0.025 mcg per mL (mcg/mL) 2 and 6 hours after the second 50-mg intramammary dose **{R-14; 15}**.
Mammary tissue: 10 mcg per gram (mcg/gram) 10 hours after the second dose **{R-4}**.
Milk: > 150 mcg/mL in the first assay sample, taken 4 hours after each dose **{R-4}**.

Liver concentration:

Total—The concentration of pirlimycin and metabolites (primarily pirlimycin sulfoxide) in the liver 4 days after the second 50-mg intramammary dose is 2.18 mcg/gram **{R-11; 13; 14}**.
Parent compound (marker residue)—The concentration of pirlimycin in the liver 2 days after the second 50-mg intramammary dose is 2.33 mcg/gram; the concentration falls below 0.5 mcg/gram by 21 days after the second dose **{R-11; 14}**.

Mammary tissue concentration: Based on two intramammary doses of 50 mg each, given 24 hours apart—The mammary tissue concentration 4 days after the second dose is 0.927 mcg/gram **{R-14; 15}**.

Milk concentration: Based on a 50-mg intramammary dose at 0 and 24 hours, the milk pirlimycin concentration 12 hours after the second infusion of medication is measured to be 8 to 18 mcg/mL and by 36 hours the concentration is less than 1 mcg/mL **{R-11}**.

Elimination: When pirlimycin is administered by the intramammary route, approximately 51% of the original dose is distributed into the milk, 10% into the urine, and 24% into the feces. **{R-5}** Of the total dose, 68% is recovered as unchanged pirlimycin. **{R-5}**

Precautions to Consider

Patient monitoring

The following may be especially important in patient monitoring (other tests may be warranted in some patients, depending on condition; » = major clinical significance):

Bacteriologic pathogens in milk
(milk samples should be tested three weeks after treatment with pirlimycin is discontinued; mastitis is not considered bacteriologically cured until samples show an absence of the mastitis-causing organism; for refractory *Staphylococcus aureus* mastitis, in which control, but not elimination, is achieved, *S. aureus* can reappear in milk cultures by 10 hours after the second treatment **{R-4}**)

Side/Adverse Effects

Note: All clinical efficacy and toxicity studies performed with intramammary pirlimycin in cows have shown it to be nonirritating **{R-11}**. No serious adverse effects associated with the use of pirlimycin in cows have been documented. The Food and Drug Administration Adverse Drug Experience reporting program has received only one report of urticaria, possibly drug-related, in three cows that responded well to treatment for the urticaria **{R-16}**.

Overdose

For information in cases of overdose or unintentional ingestion, **contact the American Society for the Prevention of Cruelty to Animals (ASPCA) National Animal Poison Control Center (888-426-4435 or 900-443-0000; a fee may be required for consultation) and/or the drug manufacturer.**

Client Consultation

Treatment of mastitis in dairy cattle is best achieved by a comprehensive mastitis control program in which herd management is the primary focus. The program should include good maintenance of milking equipment and constant evaluation of milking procedures and teat health as well as strategic treatment of clinical cases of mastitis. {R-9}

Veterinary Dosing Information

The choice of antibiotic for the treatment of mastitis should be based on knowledge of the culture and sensitivity of the pathogens causing mastitis in the cow and the dairy herd.

Before administration of intramammary pirlimycin, the following steps should be performed:

- The udder should be milked out completely and the teats washed with warm water and a disinfectant. Care should be taken to avoid washing excess dirt down from the udder onto the teat ends. The area should be dried thoroughly. An effective germicidal teat dip should be applied for one minute and then each teat wiped with a separate cotton ball soaked with an antiseptic such as 70% isopropyl alcohol.
- Persons performing the treatment should wash and dry their hands before each treatment.
- To administer pirlimycin, the tip of the syringe should be inserted into the teat end as little as possible and the contents of the syringe should be injected into each streak canal while the teat is held firmly.

The medication should then be gently massaged up the teat canal into the gland cistern.

Following treatment, an effective teat dip is recommended on all teats.

Intramammary Dosage Forms

PIRLIMYCIN INTRAMAMMARY INFUSION

Usual dose: Mastitis—*Cows*, lactating: Intramammary, 50 mg administered into each affected quarter, followed by a second dose administered twenty-four hours later. {R-1; 17}

Strength(s) usually available:

U.S.— {R-1; 18; 19}

Veterinary-labeled product(s):

5 mg per mL (Rx) [*Pirsue Sterile Solution*].

Canada— {R-12; 18}

Veterinary-labeled product(s):

5 mg per mL (Rx) [*Pirsue Aqueous Gel*].

Withdrawal times:

U.S.— {R-17-19}

Species	Withdrawal time	
	Meat (days)	Milk (hours)
<i>Cows</i>	9	36

Canada— {R-12; 18}

Species	Withdrawal time	
	Meat (days)	Milk (hours)
<i>Cows</i>	28	48

Packaging and storage: Store at 25 °C (77 °F) or less, unless otherwise specified by manufacturer. Protect from freezing. {R-1}

USP requirements: Not in USP {R-20}.

Developed: 07/09/96

Revised: 02/27/98

Interim revision: 06/30/02; 02/28/03

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